

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents
 United States Patent and Trademark
 Office
 Box PCT
 Washington, D.C. 20231
 ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 25 May 2000 (25.05.00)	
International application No. PCT/DK99/00508	Applicant's or agent's file reference 21909 PC 1
International filing date (day/month/year) 28 September 1999 (28.09.99)	Priority date (day/month/year) 28 September 1998 (28.09.98)
Applicant MELDAL, Morten et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

25 April 2000 (25.04.00)

☐ in a notice effecting later election filed with the International Bureau on:2. The election ☒ was☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer Claudio Borton Telephone No.: (41-22) 338.83.38
--	---

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FACSIMILE TRANSMISSION

Total # of Pages 8 (including this page)

TO:	PHONE:	FAX #:
Ms. Francine Young U.S. Patent and Trademark Office	703 305 3662	703 746 6713

From: Stephen A. Bent
Sender's Direct Dial: 202-672-5404
Date: July 26, 2002
Client/Matter No: 030307/0196
User ID No: 0056

MESSAGE:

RE: U.S. Patent Application No. 09/787,881 – Morten MELDAL et al.
Title: **PEG-BASED MACROMONOMERS, CHEMICALLY INERT POLYMERS
PREPARED THEREFROM AND THE USE OF THESE POLYMERS FOR
ORGANIC SYNTHESIS AND ENZYME REACTIONS**
Our Ref.: 030307/0196

Please find attached a copy of PCT Notification of Transmittal of the International Preliminary Examination Report for the above-identified application.

If you have any questions or would like to discuss this, do not hesitate to contact us.

Kindly acknowledge receipt of this facsimile and its attachments by return of a telefax.

If there are any problems with this transmission or if you have not received all of the pages, please call 202-672-5352

Operator:	Time Sent:	Return Original To:
		Doris Barnes/dyc

CONFIDENTIALITY NOTICE: THE INFORMATION CONTAINED IN THIS FACSIMILE MESSAGE IS INTENDED ONLY FOR THE PERSONAL AND CONFIDENTIAL USE OF THE DESIGNATED RECIPIENTS NAMED ABOVE. THIS MESSAGE MAY BE AN ATTORNEY-CLIENT COMMUNICATION, AND AS SUCH IS PRIVILEGED AND CONFIDENTIAL. IF THE READER OF THIS MESSAGE IS NOT THE INTENDED RECIPIENT OR ANY AGENT RESPONSIBLE FOR DELIVERING IT TO THE INTENDED RECIPIENT, YOU ARE HEREBY NOTIFIED THAT YOU HAVE RECEIVED THIS DOCUMENT IN ERROR, AND THAT ANY REVIEW, DISSEMINATION, DISTRIBUTION OR COPYING OF THIS MESSAGE IS STRICTLY PROHIBITED. IF YOU HAVE RECEIVED THIS COMMUNICATION IN ERROR, PLEASE NOTIFY US IMMEDIATELY BY TELEPHONE AND RETURN THE ORIGINAL MESSAGE TO US BY MAIL. THANK YOU.

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

To: PLOUGMANN
VINGTOFT & PARTNERS
Sankt Annæ Plads 11
P.O. Box 3007
DK-1021 Copenhagen K
DANEMARK

28 AUG. 2000

Kra/A40

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL PRELIMINARY
EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing
(day/month/year) 25.08.2000

Applicant's or agent's file reference
21909 PC 1

IMPORTANT NOTIFICATION

International application No.
PCT/DK99/00508

International filing date (day/month/year)
28/09/1999

Priority date (day/month/year)
28/09/1998


Applicant
CARLSBERG A/S et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.
4. **REMINDER**
The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/

 European Patent Office
D-80298 Munich
Tel: +49 89 2369-10 Te: 523658 eomu d

Authorized officer

Connolly, M




PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 21909 PC 1		FOR FURTHER ACTION		See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/DK99/00508		International filing date (day/month/year) 28/09/1999	Priority date (day/month/year) 28/09/1998	
International Patent Classification (IPC) or national classification and IPC C08G65/32				
Applicant CARLSBERG A/S et al.				
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of sheets.</p>				
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input checked="" type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application 				
Date of submission of the demand 25/04/2000		Date of completion of this report 25.08.2000		
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer Rousseau, F Telephone No. +49 89 2399 8297		



**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/DK99/00508

I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.)*:

Description, pages:

1-30 as originally filed

Claims, No.:

1-36 as originally filed

Drawings, sheets:

1-9 as originally filed

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

4. Additional observations, if necessary:**IV. Lack of unity of invention**

1. In response to the invitation to restrict or pay additional fees the applicant has:

- ☐ restricted the claims.
☐ paid additional fees.
☐ paid additional fees under protest.
☒ neither restricted nor paid additional fees.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/DK99/00508

2. ☐ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

☐ complied with.

☒ not complied with for the following reasons:

see separate sheet

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

☐ all parts.

☒ the parts relating to claims Nos. 1-3 (part), 5, 6,7-11 (part), 13,14,15(part),17-18,19-36(part).

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-3 (part), 5, 6,7-11 (part), 13,14,15(part),17,18,19-36(part)
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-3 (part), 5, 6,7-11 (part), 13,14,15(part),17,18,19-36(part)
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-3 (part), 5,6,7-11 (part), 13,14,15(part),17,18,19-36(part)
	No:	Claims	

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PC/DK39/00508

1. The International Examining Authority found multiple groups of inventions in this international application, as follows:

- (1) Claims 1-3 (partially), 36 (partially) : Macromonomers of polyethylene glycol having repeat units in the range 6-300 and only one vinylphenylalkyl end-capping agent (i.e. macromonomers which are not self-crosslinkable).
- (2) Claims 7-10 (partially) : Process for the preparation of macromonomers of Polyethylene glycol having repeat units in the range 6-300 and only one vinylphenylalkyl end-capping agent.
- (3) Claims 1-3 (partially), 4, 6, 11 (partially), 12, 15 (partially), 16, 19-35 (partially), 36 (partially) : Subject-matters related to macromonomers of polyethylene glycol having repeat units in the range 6-300 and which contain at least two vinylphenylalkyl end-capping agents (i.e. macromonomers which are self-crosslinkable).
- (4) Claims 1-3 (partially), 5, 6, 7-11 (partially), 13, 14, 15 (partially), 17, 18, 19-36 (partially) : Subject-matters related to macromonomers of polyethylene glycol having repeat units in the range 6-300 and an end-capping agent comprising an oxetane group.

The common concept linking the four above subject-matters is the use of a macromonomer of polyethylene glycol having repeat units in the range 6-300 and at least one end-capping agent, said end-capping agent having a polymerizable group. This unifying concept is however already known from the article of Gnanou et al., Makromol. Chem. 188, 2111-2119 (1987) (see page 2111, first paragraph of the introduction, page 2116, item 3. and corresponding passage in the experimental part on page 2118 and the conclusion page 2117). This common unifying concept is also disclosed in example 6 and claim 1 of EP-A-0 415 404 (see also example 1 and page 4, lines 41-47), where a macromonomer of polyethylene glycol having an average molecular weight of 8000 (i.e. contains about 180 repeat units) and allyl end-capping agents is disclosed. It is pointed out that the macromonomers of polyethylene glycol having repeat units in the range 6-300 and only one vinylphenylalkyl end-capping agent (subject 1) and the

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/DK99/00508

process defined in present claims 7 to 10 for their preparation (subject 2) are not linked as to form a novel single inventive concept since the polymer themselves are partially already known from the article of Gnanou et al. The process defined in present claims 7 to 10 being different from that disclosed in the article of Gnanou et al., a separate search would have been necessary for the process defined in present claims 7 to 10 (subject 2).

2. No search fee was paid for the above invention (2). No examination fee was paid for the above inventions (1) and (3). The following analysis is therefore given for invention (4), i.e. the subject-matter of claims 1-3, 5, 6, 7-11, 13, 14, 15, 17, 18 and 19-36 as far as macromonomers of polyethylene glycol having repeating units in the range 6-300 and which contain an end-capping agent comprising an oxetane group are concerned.

None of the documents found by the international search authority discloses a macromonomers of polyethylene glycol having an oxetane end-group. The subject-matter of present claims 1-3, 5, 6, 7-11, 13, 14, 15, 17, 18 and 19-36 meets therefore the requirements of Art. 33(2) PCT.

US-A-5 352 756 (D1) and US-A-5 573 934 (D2) represent an equivalent closest prior art for analysis of inventive step of the subject-matter of present claims since they both relate to crosslinked poly(ethylene glycol)s formed by the polymerization of a poly(ethylene glycol) macromonomer (see D1, claim 1 and D2, claim 15, passage from column 5, line 44 to column 6, line 32). The subject-matter of present claims differs from the closest prior art documents in that the macromonomers contain at least one oxetane end-group as defined in present claim 1. The objective technical problem solved by this distinguishing feature can be seen as to provide PEG-based resins which are quite labile to harsh and generally used reaction conditions (see last paragraph of page 1 of the present application). None of the documents found by the international search authority teaches the use of an oxetane end-group as defined in present claim 1 for end-capping polymers. It was therefore not obvious for a person skilled in the art to use the oxetane end-capping agents defined in claim 1, if he wanted to provide PEG-based resins which are quite labile to harsh and generally used reaction conditions. The subject-matter of present claims 1-3, 5, 6, 7-11, 13, 14, 15, 17, 18

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/DK99/00508

and 19-36 is therefore inventive as required by Art. 33(3) PCT.

The subject-matter of present claims is industrially applicable (Art. 33(4) PCT).

3. The article of Rademan et al. in J. Am. Chem. Soc. (1999), 121(23), 5459-5466 (D3) has been published after the date of priority claimed for the present application, but before its date of filing. If the present claims did not enjoy the claimed right of priority, D3 would be relevant for assessing novelty and inventive step of the subject-matter of the present claims.

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/DK 99/00508

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C08G65/32 C08G65/26 C08F283/06 C07K1/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C08G C08F C07K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.:
X	✓ GNANOU ET AL.: "Macromonomer synthesis. New functionalization methods" MAKROMOL. CHEM., vol. 188, 1987, pages 2111-2119, XP002126363	1-3, 36
Y	Page 2111, first paragraph of the introduction, Page 2116, point 3. and corresponding passage in the experimental part, Page 2117, conclusion page 2116, point 3, lines 13-15	1-4, 6, 11, 12, 15, 16, 19-36

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☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

A document defining the general state of the art which is not considered to be of particular relevance

E earlier document but published on or after the international filing date

L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

O document referring to an oral disclosure, use, exhibition or other means

P document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

B document member of the same patent family

Date of the actual completion of the international search

23 March 2000

Date of mailing of the international search report

12.04.00

Name and mailing address of the ISA

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Authorized officer

Rousseau, F

INTERNATIONAL SEARCH REPORT

Inter. Appl. No.

PCT/DK 99/00508

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	<p>✓CHEMICAL ABSTRACTS, vol. 130, no. 8, 22 February 1999 (1999-02-22) Columbus, Ohio, US; abstract no. 96182, BUCHARDT, JENS ET AL: "A chemically inert hydrophilic resin for solid phase organic synthesis" XP002126364 abstract & TETRAHEDRON LETT. (1998), 39(47), 8695-8698 ,</p>	1-3,36
X	<p>✓CHEMICAL ABSTRACTS, vol. 121, no. 8, 22 August 1994 (1994-08-22) Columbus, Ohio, US; abstract no. 84500, KAWAGUCHI, SEIGOU ET AL: "Fluorescence Probe Study of Micelle Formation of Poly(ethylene oxide) Macromonomers in Water" XP002126365 abstract & J. PHYS. CHEM. (1994), 98(32), 7891-8 ,</p>	1,36
X	<p>✓CHEMICAL ABSTRACTS, vol. 126, no. 22, 2 June 1997 (1997-06-02) Columbus, Ohio, US; abstract no. 293659, NOMURA, EIJI ET AL: "Radical Polymerization Kinetics of Poly(ethylene oxide) Macromonomers" XP002126366 abstract & MACROMOLECULES (1997), 30(10), 2811-2817</p>	1,36
X,P	<p>✓DATABASE CHEMABS 'Online! CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US RADEMANN, JOERG ET AL: "SPOCC: A Resin for Solid-Phase Organic Chemistry and Enzymatic Reactions on Solid Phase" retrieved from STN Database accession no. 131:129548 XP002133382 abstract & J. AM. CHEM. SOC. (1999), 121(23), 5459-5466 , XP000882852</p> <p style="text-align: center;">-/-</p>	1-3, 5-11, 13-15, 17-36

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/DK 99/00508

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	✓US 5 352 756 A (MELDAL MORTEN P) 4 October 1994 (1994-10-04)	1-4, 6, 11, 12, 15, 16, 19-36
A	claim 1	1-3, 5-11, 13-15, 17-36
Y	✓US 5 573 934 A (HOSSAINY SYED F A ET AL) 12 November 1996 (1996-11-12)	1-4, 6, 11, 12, 15, 16, 19-36
A	column 5, line 44 -column 6, line 32; claim 15	1-3, 5-11, 13-15, 17-36
Y	✓JUS 4 774 356 A (INOUE SHOHEI ET AL) 27 September 1988 (1988-09-27)	1-4, 6, 11, 12, 15, 16, 19-36
	column 7, lines 34-43 column 3, line 37; examples 1-4	
X	✓WO 97 42242 A (OGAWA RYUTARO ;OKANO TERUO (JP); KATO MASAO (JP); NAGASAKI YUKIO () 13 November 1997 (1997-11-13)	1, 36
Y	the whole document abstract page 17 -page 18	1-4, 6, 11, 12, 15, 16, 19-36
	& DATABASE WPI Derwent Publications Ltd., London, GB; AN 1997-558926 '51! abstract	
A	✓WO 91 15952 A (CARDIOPULMONICS INC) 31 October 1991 (1991-10-31)	1-3, 5-11, 13-15, 17-36
	page 24 -page 25	
P, A	✓WO 99 29759 A (MACROMED INC) 17 June 1999 (1999-06-17)	1-3, 5-11, 13-15, 17-36
	page 9, formula 8 claim 1	

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/DK 99/00508

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	✓EP 0 415 404 A (KANEGAFUCHI CHEMICAL IND) 6 March 1991 (1991-03-06) the whole document -----	1-3, 36

INTERNATIONAL SEARCH REPORT

International application No.
PCT/DK 99/00508

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☒ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
1-6,7-10 (partially),11-36

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-3 (partially), 36 (partially)

Macromonomers of polyethylene glycol having repeat units in the range 6-300 and only one vinylphenylalkyl end-capping agent (i.e. macromonomers which are not self-crosslinkable).

2. Claims: 7-10 (partially)

Process for the preparation of macromonomers of polyethylene glycol having repeat units in the range 6-300 and only one vinylphenylalkyl end-capping agent.

3. Claims: 1-3 (partially), 4, 6, 11 (partially), 12, 15 (partially), 16, 19-35 (partially), 36 (partially)

Subject-matters related to macromonomers of polyethylene glycol having repeat units in the range 6-300 and which contain at least two vinylphenylalkyl end-capping agents (i.e. macromonomers which are self-crosslinkable).

4. Claims: 1-3 (partially), 5, 6, 7-11 (partially), 13, 14, 15 (partially), 17, 18, 19-36 (partially)

Subject-matters related to macromonomers of polyethylene glycol having repeat units in the range 6-300 and an end-capping agent comprising an oxetane group.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/DK 99/00508

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5352756 A	04-10-1994	AT 152143 T	15-05-1997
		AU 3493493 A	03-09-1993
		BR 9305894 A	19-08-1997
		CA 2129442 A	14-08-1993
		DE 69310148 D	28-05-1997
		DE 69310148 T	31-07-1997
		WO 9316118 A	19-08-1993
		DK 625996 T	02-06-1997
		EP 0625996 A	30-11-1994
		ES 2101300 T	01-07-1997
		JP 7503744 T	20-04-1995
US 5573934 A	12-11-1996	US 5529914 A	25-06-1996
		US 5858746 A	12-01-1999
		US 5834274 A	10-11-1998
		US 5843743 A	01-12-1998
		US 5749968 A	12-05-1998
		AU 683209 B	06-11-1997
		AU 3780993 A	13-09-1993
		BR 9306041 A	18-11-1997
		CA 2117584 A,C	02-09-1993
		EP 0627912 A	14-12-1994
		JP 7506961 T	03-08-1995
		NZ 251039 A	26-03-1996
		WO 9316687 A	02-09-1993
		US 5801033 A	01-09-1996
US 4774356 A	27-09-1988	JP 1891420 C	07-12-1994
		JP 6013604 B	23-02-1994
		JP 61215623 A	25-09-1986
		CA 1250080 A	14-02-1989
		EP 0196569 A	08-10-1986
WO 9742242 A	13-11-1997	JP 9302048 A	25-11-1997
WO 9115952 A	31-10-1991	US 5338770 A	16-08-1994
		AU 7671791 A	11-11-1991
		CA 2080229 A	13-10-1991
		EP 0531305 A	17-03-1993
		JP 7000103 B	11-01-1995
		JP 5504902 T	29-07-1993
WO 9929759 A	17-06-1999	AU 1910799 A	28-06-1999
EP 0415404 A	06-03-1991	JP 2558165 B	27-11-1996
		JP 3088825 A	15-04-1991
		AU 635764 B	01-04-1993
		AU 6197990 A	07-03-1991
		CA 2024451 A	01-03-1991
		US 5130413 A	14-07-1992

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 21909 PC 1	FOR FURTHER ACTION		see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
International application No. PCT/DK 99/00508	International filing date (<i>day month year</i>) 28/09/1999	(Earliest) Priority Date (<i>day month year</i>) 28/09/1998	
Applicant CARLSBERG A/S et al.			

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 7 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :



contained in the international application in written form.



filed together with the international application in computer readable form.



furnished subsequently to this Authority in written form.



furnished subsequently to this Authority in computer readable form.



the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.



the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☒ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.



as suggested by the applicant.



because the applicant failed to suggest a figure.



because this figure better characterizes the invention.



None of the figures.

INTERNATIONAL SEARCH REPORT

International application No
PCT/DK 99/00508**Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)**

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos. :
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos. :
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos. :
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 5.4(a)

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos. :
1-6,7-10 (partially),11-36
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos. :

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest
- ☒ No protest accompanied the payment of additional search fees

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-3 (partially), 36 (partially)

Macromonomers of polyethylene glycol having repeat units in the range 6-300 and only one vinylphenylalkyl end-capping agent (i.e. macromonomers which are not self-crosslinkable).

2. Claims: 7-10 (partially)

Process for the preparation of macromonomers of polyethylene glycol having repeat units in the range 6-300 and only one vinylphenylalkyl end-capping agent.

3. Claims: 1-3 (partially), 4, 6, 11 (partially), 12, 15 (partially), 16, 19-35 (partially), 36 (partially)

Subject-matters related to macromonomers of polyethylene glycol having repeat units in the range 6-300 and which contain at least two vinylphenylalkyl end-capping agents (i.e. macromonomers which are self-crosslinkable).

4. Claims: 1-3 (partially), 5, 6, 7-11 (partially), 13, 14, 15 (partially), 17, 18, 19-36 (partially)

Subject-matters related to macromonomers of polyethylene glycol having repeat units in the range 6-300 and an end-capping agent comprising an oxetane group.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/DK 99/00508

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 C08G65/32 C08G65/26 C08F283/06 C07K1/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C08G C08F C07K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GNANOU ET AL.: "Macromonomer synthesis. New functionalization methods" MAKROMOL. CHEM., vol. 188, 1987, pages 2111-2119, XP002126363	1-3, 36
Y	Page 2111, first paragraph of the introduction, Page 2116, point 3. and corresponding passage in the experimental part, Page 2117, conclusion page 2116, point 3, lines 13-15	1-4, 6, 11, 12, 15, 16, 19-36
	---	-/--



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

° Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

G document member of the same patent family

Date of the actual completion of the international search

23 March 2000

Date of mailing of the international search report

2000.04.08

Name and mailing address of the ISA

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 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Rousseau, F

INTERNATIONAL SEARCH REPORT

International Application No

PCT/DK 99/00508

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	CHEMICAL ABSTRACTS, vol. 130, no. 8, 22 February 1999 (1999-02-22) Columbus, Ohio, US; abstract no. 96182, BUCHARDT, JENS ET AL: "A chemically inert hydrophilic resin for solid phase organic synthesis" XP002126364 abstract & TETRAHEDRON LETT. (1998), 39(47), 8695-8698 , ---	1-3,36
X	CHEMICAL ABSTRACTS, vol. 121, no. 8, 22 August 1994 (1994-08-22) Columbus, Ohio, US; abstract no. 84500, KAWAGUCHI, SEIGOU ET AL: "Fluorescence Probe Study of Micelle Formation of Poly(ethylene oxide) Macromonomers in Water" XP002126365 abstract & J. PHYS. CHEM. (1994), 98(32), 7891-8 , ---	1,36
X	CHEMICAL ABSTRACTS, vol. 126, no. 22, 2 June 1997 (1997-06-02) Columbus, Ohio, US; abstract no. 293659, NOMURA, EIJI ET AL: "Radical Polymerization Kinetics of Poly(ethylene oxide) Macromonomers" XP002126366 abstract & MACROMOLECULES (1997), 30(10), 2811-2817 , ---	1,36
X,P	DATABASE CHEMABS 'Online! CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US RADEMANN, JOERG ET AL: "SPOCC: A Resin for Solid-Phase Organic Chemistry and Enzymatic Reactions on Solid Phase" retrieved from STN Database accession no. 131:129548 XP002133382 abstract & J. AM. CHEM. SOC. (1999), 121(23), 5459-5466 , XP000882852 ---	1-3, 5-11, 13-15, 17-36
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ST/DK 99/00508

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 352 756 A (MELDAL MORTEN P) 4 October 1994 (1994-10-04)	1-4, 6, 11, 12, 15, 16, 19-36
A	claim 1	1-3, 5-11, 13-15, 17-36
Y	US 5 573 934 A (HOSSAINY SYED F A ET AL) 12 November 1996 (1996-11-12)	1-4, 6, 11, 12, 15, 16, 19-36
A	column 5, line 44 -column 6, line 32; claim 15	1-3, 5-11, 13-15, 17-36
Y	US 4 774 356 A (INOUE SHOHEI ET AL) 27 September 1988 (1988-09-27)	1-4, 6, 11, 12, 15, 16, 19-36
X	column 7, lines 34-43 column 3, line 37; examples 1-4	1, 36
Y	WO 97 42242 A (OGAWA RYUTARO ;OKANO TERUO (JP); KATO MASAO (JP); NAGASAKI YUKIO () 13 November 1997 (1997-11-13) the whole document abstract page 17 -page 18	1-4, 6, 11, 12, 15, 16, 19-36
A	& DATABASE WPI Derwent Publications Ltd., London, GB; AN 1997-558926 '51! abstract	1-3, 5-11, 13-15, 17-36
P, A	WO 91 15952 A (CARDIOPULMONICS INC) 31 October 1991 (1991-10-31) page 24 -page 25	1-3, 5-11, 13-15, 17-36
	WO 99 29759 A (MACROMED INC) 17 June 1999 (1999-06-17) page 9, formula 8 claim 1	1-3, 5-11, 13-15, 17-36

INTERNATIONAL SEARCH REPORT

International Application No

PCT/DK 99/00508

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 415 404 A (KANEGAFUCHI CHEMICAL IND) 6 March 1991 (1991-03-06) the whole document -----	1-3, 36

INTERNATIONAL SEARCH REPORT

Information on patent family members

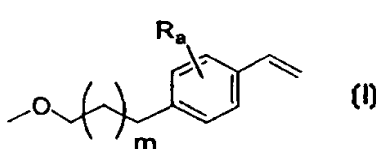

International Application No

PCT/DK 99/00508

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			AU 7671791 A	11-11-1991
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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁷ : C08G 65/32, 65/26, C08F 283/06, C07K 1/04		A3	(11) International Publication Number: WO 00/18823
			(43) International Publication Date: 6 April 2000 (06.04.00)
(21) International Application Number: PCT/DK99/00508 (22) International Filing Date: 28 September 1999 (28.09.99) (30) Priority Data: PA 1998 01224 28 September 1998 (28.09.98) DK (71) Applicant (for all designated States except US): CARLSBERG A/S [DK/DK]; Carlsberg Laboratorium, Gamle Carlsberg Vej 10, DK-2500 Valby (DK). (72) Inventors; and (75) Inventors/Applicants (for US only): MELDAL, Morten [DK/DK]; Nitivej 11, 3.th., DK-2000 Frederiksberg (DK). BUCHARDT, Jens [DK/DK]; Nr. Farimagsgade 69, 2.th., DK-1364 Copenhagen K (DK). RADEMANN, Jörg [DE/DK]; Handelsvej 17, st.th., DK-2450 Copenhagen (DK). (74) Agent: PLOUGMANN, VINGTOFT & PARTNERS A/S; Sankt Annæ Plads 11, P.O. Box 3007, DK-1021 Copenhagen K (DK).		(81) Designated States: AE, AL, AM, AT, AT (Utility model), AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), DM, EE, EE (Utility model), ES, FI, FI (Utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published With international search report. (88) Date of publication of the international search report: 17 August 2000 (17.08.00)	
(54) Title: PEG-BASED MACROMONOMERS, CHEMICALLY INERT POLYMERS PREPARED THEREFROM AND THE USE OF THESE POLYMERS FOR ORGANIC SYNTHESIS AND ENZYME REACTIONS <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>(I)</p> </div> <div style="text-align: center;">  <p>(II)</p> </div> </div>			
(57) Abstract The present invention relates to macromonomers containing ethylene glycol repeat units, to chemically inert polymers prepared therefrom and to the use of such polymers in solid phase biochemical assays. A macromonomer of polyethylene glycol having repeat units in the range 6-300 and having at least one end terminated by an ether group having formula (I) where m is an integer of 0-10, a is an integer of 1-4, and R is H or alkyl or aryl or arylalkyl; or having formula (II) where m is an integer of 1-10, and R is H or alkyl or aryl or arylalkyl.			

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DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

INTERNATIONAL SEARCH REPORT

National Application No.

/DK 99/00508

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C08G65/32 C08G65/26 C08F283/06 C07K1/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C08G C08F C07K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GNANOU ET AL.: "Macromonomer synthesis. New functionalization methods" MAKROMOL. CHEM., vol. 188, 1987, pages 2111-2119, XP002126363 Page 2111, first paragraph of the introduction, Page 2116, point 3. and corresponding passage in the experimental part, Page 2117, conclusion	1-3,36
Y	page 2116, point 3, lines 13-15 --- -/--	1-4,6, 11,12, 15,16, 19-36



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

Z document member of the same patent family

Date of the actual completion of the international search

23 March 2000

Date of mailing of the international search report

12.6.04.00

Name and mailing address of the ISA

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Fax: (+31-70) 340-3016

Authorized officer

Rousseau, F

INTERNATIONAL SEARCH REPORT

International Application No.

PDK 99/00508

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	CHEMICAL ABSTRACTS, vol. 130, no. 8, 22 February 1999 (1999-02-22) Columbus, Ohio, US; abstract no. 96182, BUCHARDT, JENS ET AL: "A chemically inert hydrophilic resin for solid phase organic synthesis" XP002126364 abstract & TETRAHEDRON LETT. (1998), 39(47), 8695-8698 , ---	1-3,36
X	CHEMICAL ABSTRACTS, vol. 121, no. 8, 22 August 1994 (1994-08-22) Columbus, Ohio, US; abstract no. 84500, KAWAGUCHI, SEIGOU ET AL: "Fluorescence Probe Study of Micelle Formation of Poly(ethylene oxide) Macromonomers in Water" XP002126365 abstract & J. PHYS. CHEM. (1994), 98(32), 7891-8 , ---	1,36
X	CHEMICAL ABSTRACTS, vol. 126, no. 22, 2 June 1997 (1997-06-02) Columbus, Ohio, US; abstract no. 293659, NOMURA, EIJI ET AL: "Radical Polymerization Kinetics of Poly(ethylene oxide) Macromonomers" XP002126366 abstract & MACROMOLECULES (1997), 30(10), 2811-2817 , ---	1,36
X,P	DATABASE CHEMABS 'Online! CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US RADEMANN, JOERG ET AL: "SPOCC: A Resin for Solid-Phase Organic Chemistry and Enzymatic Reactions on Solid Phase" retrieved from STN Database accession no. 131:129548 XP002133382 abstract & J. AM. CHEM. SOC. (1999), 121(23), 5459-5466 , XP000882852 ---	1-3, 5-11, 13-15, 17-36
	--- -/--	

INTERNATIONAL SEARCH REPORT

Original Application No

DK 99/00508

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 352 756 A (MELDAL MORTEN P) 4 October 1994 (1994-10-04)	1-4, 6, 11, 12, 15, 16, 19-36
A	claim 1	1-3, 5-11, 13-15, 17-36
Y	US 5 573 934 A (HOSSAINY SYED F A ET AL) 12 November 1996 (1996-11-12)	1-4, 6, 11, 12, 15, 16, 19-36
A	column 5, line 44 -column 6, line 32; claim 15	1-3, 5-11, 13-15, 17-36
Y	US 4 774 356 A (INOUE SHOHEI ET AL) 27 September 1988 (1988-09-27)	1-4, 6, 11, 12, 15, 16, 19-36
X	WO 97 42242 A (OGAWA RYUTARO ;OKANO TERUO (JP); KATO MASAO (JP); NAGASAKI YUKIO () 13 November 1997 (1997-11-13) the whole document	1, 36
Y	abstract page 17 -page 18	1-4, 6, 11, 12, 15, 16, 19-36
A	& DATABASE WPI Derwent Publications Ltd., London, GB; AN 1997-558926 '51! abstract	1-3, 5-11, 13-15, 17-36
P, A	WO 91 15952 A (CARDIOPULMONICS INC) 31 October 1991 (1991-10-31) page 24 -page 25	1-3, 5-11, 13-15, 17-36
	WO 99 29759 A (MACROMED INC) 17 June 1999 (1999-06-17) page 9, formula 8 claim 1	1-3, 5-11, 13-15, 17-36

-/--

INTERNATIONAL SEARCH REPORT

onal Application No

/DK 99/00508

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>EP 0 415 404 A (KANEKAFUCHI CHEMICAL IND) 6 March 1991 (1991-03-06) the whole document</p> <p>-----</p>	1-3, 36

INTERNATIONAL SEARCH REPORT

International application No.
PCT/DK 99/00508

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.
because they relate to subject matter not required to be searched by this Authority, namely

2. ☐ Claims Nos.
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically.

3. ☐ Claims Nos.
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6 4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☒ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.
1-6,7-10 (partially),11-36

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest
- ☒ No protest accompanied the payment of additional search fees

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-3 (partially), 36 (partially)

Macromonomers of polyethylene glycol having repeat units in the range 6-300 and only one vinylphenylalkyl end-capping agent (i.e. macromonomers which are not self-crosslinkable).

2. Claims: 7-10 (partially)

Process for the preparation of macromonomers of polyethylene glycol having repeat units in the range 6-300 and only one vinylphenylalkyl end-capping agent.

3. Claims: 1-3 (partially), 4 , 6, 11 (partially) , 12, 15 (partially), 16, 19-35 (partially), 36 (partially)

Subject-matters related to macromonomers of polyethylene glycol having repeat units in the range 6-300 and which contain at least two vinylphenylalkyl end-capping agents (i.e. macromonomers which are self-crosslinkable).

4. Claims: 1-3 (partially), 5, 6, 7-11 (partially), 13, 14, 15 (partially), 17, 18, 19-36 (partially)

Subjet-matters related to macromonomers of polyethylene glycol having repeat units in the range 6-300 and an end-capping agent comprising an oxetane group.

INTERNATIONAL SEARCH REPORT

... on patent family members

onal Application No

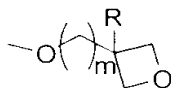
/DK 99/00508

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CLAIMS (as considered by the IPEA):

1. A macromonomer of polyethylene glycol having repeat units in the range 6-300 and having at least one end terminated by an ether group having the formula

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where m is an integer of 1-10, and

R is H or alkyl or aryl or arylalkyl.

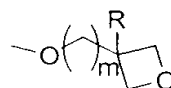
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2. A macromonomer having the structure:



where \tilde{n} is a real number of 6-300,

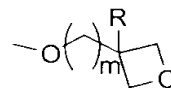
and where X and Y each independently is a group of the formula



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where m is an integer of 1-10, and R is H or alkyl or aryl or arylalkyl,

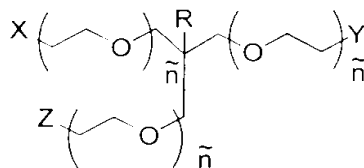
or where X is -OH, and Y is a group of the formula



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where m is an integer of 1-10, and R is H or alkyl or aryl or arylalkyl.

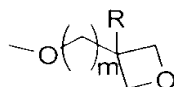
3. A macromonomer having the structure:



where R is H or alkyl or aryl or arylalkyl,

5 and \tilde{n} is a real number of 6-300 as defined above

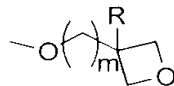
and where X, Y and Z each independently is OH or a group of the formula



where m is an integer of 1-10, a is as defined above, and R is H or

10 alkyl or aryl or arylalkyl,

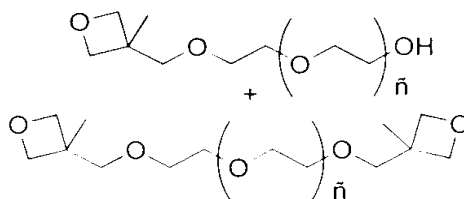
provided that at least one of X , Y or Z is a group of the formula



where m is an integer of 1-10, a is as defined above, and R is H or

15 alkyl or aryl or arylalkyl.

4. A macromonomer according to claim 2 which is terminated by an 3-methyloxetan-3-ylmethyl ether group and has the formula:

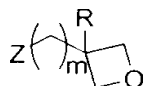


where $\tilde{n} = 6-300$

5 where R and m are as defined in claim 1.

5. A macromonomer according to claim 4, which has been acetylated or in other ways temporarily hydroxyl-protected on free hydroxyl groups.

10 6. A process for the preparation of the macromonomers of claims 1 or 2 comprising reacting an alkali metal derivative of a polyethylene glycol having 6-300 repeating units with a halo substituted compound having the formula:

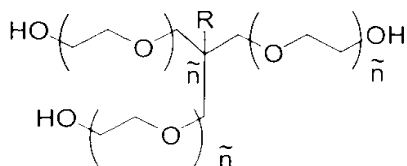


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where Z is Cl, Br, I, toluenesulfonyloxy or CF_3SO_3

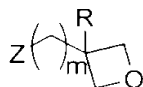
and where m is an integer of 1-10, and R is H or alkyl or aryl or arylalkyl

7. A process for the preparation of the macromonomer of claim 3 comprising reacting
20 an alkali metal derivative of a polyethylene glycol having the formula: -



where R is H or alkyl or aryl or arylalkyl and \tilde{n} is 6-300

with a halo substituted compound having the formula:



5

where Z is Cl, Br, I, toluenesulfonyloxy or CF_3SO_3

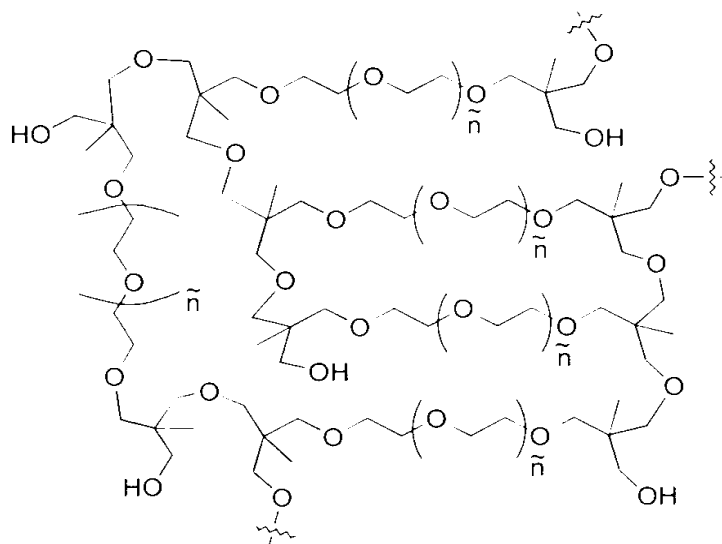
and where m is 1-10 and R is H or alkyl or aryl or arylalkyl

8. A process according to claims 6 or 7 wherein the alkali metal derivative is a sodium derivative.

9. A process according to claims 6 or 7 wherein the alkali metal derivative is a potassium derivative.

10. A cross linked polymer formed by the polymerisation of a macromonomer according to claim 2.

11. A cross linked polymer according to claim 10 wherein the macromonomer has the structure claimed in claim 4, the polymerisation is initiated by a cationic catalyst and the structure of the polymer may be represented by the structure:



where $\tilde{n} = 6-300$

5

where R is as defined in claim 1.

12. A crosslinked polymer according to claim 10 wherein the macromer used for its preparation has the structure of claim 5 and the per-*O*-acetylated or in other ways temporarily hydroxyl-protected polymer structure analog to the hydroxylated structure of claim 11 is obtained.

13. A cross linked polymer formed by the bulk polymerisation of a macromonomer of claim 3.

15

14. A beaded resin according to claim 11 or 12 formed by polymerization of droplets in silicon oil.

15. A beaded resin according to claim 11 or 12 formed by spray polymerization in a hot inert gas.

16. The use of polymers prepared according to claim 10 as supports for organic
5 synthesis.

17. The use of polymers prepared according to claim 10 as supports for solid phase enzyme reactions.

10 18. The use of polymers prepared according to claim 10 as supports for synthesis of peptides, DNA, RNA and oligosaccharides.

19. The use of polymers prepared according to claim 10 as supports for peptide-, protein-, DNA- or RNA-ligation.

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20. The use of polymers prepared according to claim 10 for chromatographic separations.

21. The use of polymers prepared according to claim 10 for affinity purification.

20

22. The use of polymers prepared according to claim 10 for protein immobilisation

23. The use of polymers according to claim 17 in which the enzyme interact with a substrate or an inhibitor linked to the support.

25

24. The use of polymers according to claim 10 in which the use involves release of a drug bound to the solid support.

25. Release of a drug according to claim 24 where the release is mediated by an
5 enzyme.

26. The use of polymers according to claim 10 for solid phase magic angle spinning NMR-spectroscopy.

10 27. The use of polymers according to claim 10 for combinatorial chemistry.

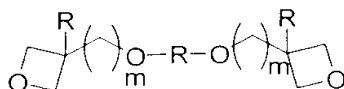
28. A beaded polymer according to claim 10 formed by suspension polymerization in silicon oil.

15 29. A beaded polymer according to claim 28 where the beads are stabilized by a surfactant

30. A beaded polymer according to 29 where the surfactant is obtained by radical polymerization of a mixture of acryloylated PEG-OMe and acryloyl propyl pentamethyl
20 disiloxane.

31. A polymer according to claim 10 with addition of a short temporary crosslinker which may at a later point in time be selectively cleaved to result in expansion of the resin.

32. A polymer according to claim 31 where the short crosslinker has the structure



where R is a alkyliden, aryliden, silane, siloxane thioether or ether bridge

5 chemically susceptible to selective cleavage conditions.

33. A macromonomer according to claim 1-5 prepared according to claim 6 or 7 but

with the inversion of electrophile and nucleophile so that the tosylate or triflate or

halide of PEG is prepared and reacted with the metal alkoxide of 3-methyl-oxetan-3-yl

10 methanol or vinylphenylpropanol.